

Chapter 3

EMERGENCY MEDICAL TREATMENT

3-1. **OBJECTIVE:** Given a list of signs or symptom for a back trauma casualty, identify and treat a spinal injury.

REFERENCES: FM 21-11

Ask the casualty if he has any pain, numbness, or tingling. Ask bystanders about the cause of the injury if the casualty is unconscious. Determine numbness by gently pinching or pricking the injured area. The casualty may not be able to move or may not experience sensation in parts of the body below the injury.

Caution the casualty not to move. The casualty must not move until the injury has been immobilized. The spinal cord must be protected from damage when the casualty is moved. The head and neck must be maintained in a stable, neutral position; extension or flexion may cause the spinal cord to be compressed disastrously and paralysis can result. If the neck is hyperextended (the head falls backward), posterior compression of the spinal cord by fractured vertebrae can occur. If the neck is flexed (the head falls forward), anterior compression of the spinal cord by fractured vertebrae can occur.

3-2. **OBJECTIVE:** Given a list of specific signs and/or symptoms, initiate the correct treatment for climatic injuries in proper sequence.

REFERENCES: FM 21-11

a. Heat Injuries. The categories of heat injuries are:

(1) Heat cramps.

(2) Heat exhaustion.

(3) Heat stroke.

b. Heat Cramps.

(1) The signs and symptoms of heat cramps are:

(a) The casualty is experiencing muscle cramps of the extremities and/or abdomen.

(b) The casualty is pale and has wet skin.

(c) He is experiencing dizziness and extreme thirst.

(2) Treatment.

(a) Move the casualty to a cool or shady area (or improvise shade).

(b) Loosen his clothing (if not in a environment).

(c) Have him slowly drink at least one canteen full of cool water.

(d) Seek medical aid should cramps continue.

c. Heat Exhaustion

(1) The signs and symptoms of heat exhaustion are:

(a) The casualty feels dizzy, weak, and/or faint.

(b) His skin feels cool and moist to the touch.

(c) He may feel nauseous or may have a headache.

(2) Treatment.

(a) Move the casualty to a cool or shady area (or improvise shade).

(b) Loosen or remove his boots (unless in a chemical environment). Pour water him and fan him (unless in a chemical environment).

(c) Have him slowly drink at least one canteen full of cool water.

(d) Elevate his legs

(e) If possible, the casualty should not participate in strenuous activity for the remainder of the day.

(f) Monitor the casualty until the symptoms are gone, or medical aid arrives.

WARNING

DO NOT loosen the casualty's clothing if in a chemical environment.

d. Heat Stroke:

(1) The signs and symptoms of heat stroke are:

(a) The casualty may have a headache and visual disturbance.

(b) He may have a high fever and will not be sweating. His skin will appear abnormally hot to the touch.

(c) His pulse may be rapid or increased.

(d) The casualty may have muscle cramps and convulsions.

(e) The casualty may feel dizzy or nauseated.

(f) Unconsciousness and collapse may occur suddenly.

WARNING

Heatstroke must be considered a medical emergency which may result in death if treatment is delayed.

(2) Treatment.

(a) Moving him to a cool or shaded area (or improvise shade).

(b) Loosening or removing his clothing (except in a chemical environment).

(c) Spraying or pouring water on him; fanning him to permit a coolant effect of evaporation.

(d) Massaging his extremities and skin, which increases the blood flow to those body areas, thus aiding the cooling process.

(e) Elevating his legs.

(f) Having him slowly drink at least one canteen full of water if he is conscious.

d. Cold injuries:

(1) The categories of cold injuries are:

(a) Chilblain.

(b) Immersion Foot/Trench Foot.

(c) Frostbite.

(d) Snow Blindness.

(e) Dehydration.

(f) Hypothermia.

(2) The signs, symptoms, and first aid are shown in Table 3-1.

Table 3-1. Cold and Wet Injuries (081-831-1009)		
Injuries	Signs/Symptoms	First Aid
Chilblain	Red, Swollen, hot, tender itching skin. Continued exposure may lead to infected (ulcerated or bleeding skin lesions).	1. Area usually responds to locally applied rewarming (body heat). 2. DO NOT rub or massage area. 3. Seek medical treatment.
Immersion Foot/ Trench Foot	Affected parts are cold, numb, and painless. As parts rewarm, they may be hot, with burning and shooting pains. Advanced stage: skin pale with bluish cast; pulse decreases, blistering, swelling heat, hemorrhages, and gangrene may follow.	1. Gradual rewarming by exposure to warm air. 2. DO NOT massage or moisten skin. 3. Protect affected part from trauma. 4. Dry feet thoroughly; avoid walking. 5. Seek medical treatment.
Frostbite	<u>Superficial</u> : Redness, blisters in 24-36 hours and sloughing of skin. <u>Deep</u> : Preceded by superficial frostbite; skin painless, pale-yellowish, waxy, "wooden" or solid to touch; blisters form in 12-36 hours.	<u>Superficial</u> : 1. Keep casualty warm; gently rewarm affected parts. 2. Decrease constricting clothing, increase exercise and insulation. <u>Deep</u> : 1. Protect the part from additional injury. 2. Seek medical treatment as fast as possible.
<p style="text-align: center;">WARNING</p> <p style="text-align: center;">DO NOT attempt to thaw deep frostbite.</p> <p>There is less danger from walking on feet while frozen than after they thaw.</p>		
Snow Blindness	Eyes may feel scratchy. Watery, redness, headache, and increased pain with exposure to light can occur.	1. Cover the eyes with a dark cloth. 2. Seek medical treatment.
Dehydration	Similar to heat exhaustion. See Table 5-1.	1. Keep warm, loosen clothes. 2. Casualty needs fluid replacement, rest, and prompt medical treatment.

Cold and Wet Injuries (081-831-1009) (continued)

Signs/Symptoms	First Aid
Casualty is cold. Shivering stops. Core temperature is low. Consciousness may be altered. Uncoordinated movements may occur. Shock and coma may result as body temperature drops.	<p>Mild Hypothermia:</p> <ol style="list-style-type: none"> 1. Rewarm body evenly and without delay (need to provide heat source; casualty's body unable to generate heat). 2. Keep dry, protect from elements. 3. Warm liquids may be given gradually (to conscious casualty only). 4. Be prepared to start basic life support measures for the casualty. 5. Seek medical treatment immediately! <p>Severe Hypothermia:</p> <ol style="list-style-type: none"> 1. Stabilize the temperature. 2. Attempt to avoid further heat loss. 3. Handle the casualty gently. 4. Evacuate to the nearest medical treatment facility as soon as possible.

NOTE

Hypothermia is a MEDICAL EMERGENCY!
 Prompt medical treatment is necessary.

3-3. **OBJECTIVE:** Given a casualty with multiple injuries and a list of treatment priorities, select the treatment priority for each injury.

REFERENCES: FM 21-11

3-4. **OBJECTIVE:** Given a list of signs and symptoms of physical and emotional battlefield fatigue, select the severity level and type of treatment necessary.

REFERENCES: FM 21-11

TEXT: Common (mild) battle fatigue and what to do are shown in Table 3-2.

Table 3-2. Common (Mild) Battle Fatigue and What To Do	
<p>Physical Signs*</p> <p>Nervous, trembling, sweating, pounding hear, dry mouth, tired, frequent urination, nausea/vomiting, diarrhea, "thousand-yard stare", tearful.</p> <p>Mental Signs*</p> <p>Forgetful, indecisive, difficulty concentrating, difficulty paying attention, anxious, easily startled by sudden noise or movement, nightmares, trouble sleeping, irritable and griping.</p>	<p>What to Do</p> <ol style="list-style-type: none"> 1. Continue mission performance. 2. Expect soldier to perform duties. 3. At all times remain calm; be directive and in control. 4. Let soldier know his reaction is common (normal), expected, and that there is nothing seriously wrong with it. 5. Keep soldier informed; control rumors. 6. Build soldier's confidence. 7. Keep soldier productive (when not resting). 8. Ensure soldier maintains personal hygiene. 9. Ensure soldier eats and drinks as soon as possible. 10. Let soldier talk with you about his feelings or personal problems. Do not "put down feelings. Give practical advice and perspective.
<p>*Most or all of these signs are present in mild battle fatigue. Many of these signs can be present in any normal soldier in combat, yet he can still do his job.</p>	

Recognize and give first aid for more serious battle fatigue reactions as shown in the following table:

Table 3-3. Recognize and Give First Aid For More Serious Battle Fatigue Reactions	
Depressed Reactions Signs*	What To Do**
Prolonged sad or vacant facial expression, slowed down, stands or sits without moving, cries, does not talk much.	1. Get soldier to relatively safe area for sleep and food (with usual comrades, if possible).
Active Reactions Signs*	2. Ensure soldier is not left unobserved. Use brief physical restraints only if necessary to protect soldier or unit.
Constantly moves around, shaking, jerky movements, talks rapidly and constantly, overly fearful, makes endless suggestions, argumentative, reckless, may see or hear things that are not there, panic running.	3. Have soldier wash and shave self.
Physical Reaction Signs*	4. Give soldier easy tasks to do when not sleeping/resting/eating.
Major loss of memory or cannot use some part of the body (arm, hand, leg, or has trouble seeing, hearing, or speaking).	5. Assure soldier he will return to full duty within 24 hours.
	6. Return soldier to normal duties as soon as he is ready.
	7. If soldier cannot be managed or does not improve, get to medic. Still tell soldier that you are counting on him to recover with rest and return to duty soon.
*These signs are present in addition to the signs of a common reaction.	
**Do these things in addition to the things in addition to the things you should do to handle a common reaction.	

3-5. **OBJECTIVE:** Given a list of body areas with various degrees of burns, select the percent of body surface burned and treatment indicated.

REFERENCES: FM 21-11

a. Pathology of Second and Third Degree Burns.

The pathologic process involved in second and third degree burns consists of three phases:

(1) Phase 1. In the first phase there is always some destruction of the skin, which results in a loss of plasma. In second degree burns, there is a temporary loss of plasma in the form of edema fluid and a permanent loss through blister fluid or through "weeping" burned surfaces. Plasma rapidly seeps into burned tissues and produces widespread edema (swelling). Edema begins to develop at the time of burning and is evident within a few hours and continues for two or three days. In second and third degree burns (particularly in third degree), there is destruction of red blood cells.

(2) Phase 2. The second phase generally begins on the third day after injury. The coagulum which forms on the surface of second degree burns and eschar (scab) on third degree burns reduces fluid losses from the surface of the burn.

(3) Phase 3. In the third phase, infection develops. Second and third degree burns are open wounds and are subject to contamination from the time they occur.

b. Classification of burns.

For emergency treatment purposes, second and third degree burns are classified by severity as minimal, moderate, or extensive, depending upon the percent of body surface burned.

(1) Degree of burns.

(a) First degree. A first degree burn is superficial and involves only the outer layers of the epidermis. An example is minor sunburn in which the skin is red and painful, but with no blisters or fluid loss. It is not an open wound and does not become infected.

(b) Second degree. The second degree (partial thickness burn) extends into, but not completely through, the dermis. This type of burn destroys or damages skin cells, glands, and blood vessels. It is characterized by redness, pain, blisters, and "weeping" or serum. Body fluids are lost through the damaged skin. The second degree burn is an open wound and is susceptible to infection.

(c) Third degree. A third degree (full thickness) burn destroys all layers of the dermis and may extend through the subcutaneous tissues into the muscle layer and underlying bone. There may be amputation of parts. This burn is characterized by insensitivity to pain (nerve branches in the area are destroyed) and a hard, dry surface which is either charred or pearly white. The surface is usually depressed below that of the surrounding second degree burn. Large amounts of body fluids are lost into the damaged tissues and through the destroyed skin layer. A third degree burn is an open wound highly susceptible to infection.

(2) Percent of body surface area burned.

(a) An early estimate of the percent of body surface area (BSA) burned is of great importance in determining the amount of fluid replacement necessary to prevent shock and in the management of mass casualties. Usually, first degree burns are not included in this estimate. For practical purposes (especially in an emergency situation), second and third degree burns are considered to have the same effect when estimating the percent of body surface burned (for fluid replacement purposes).

(b) The percent of BSA is estimated by using the "Rule of Nines." The total body surface is divided into the major anatomic parts, each part representing approximately nine percent or multiples of nine except for the perineal area. The head and neck represent nine percent; each arm including the hand, nine percent; the anterior trunk, eighteen percent; the posterior

trunk, eighteen percent; each leg including the foot, eighteen percent; and the perineum and external genitalia, one percent. Proportionate areas of these parts may be estimated.

3-6. **OBJECTIVE:** Given a list of injuries, sustainment, treatment, location, and nationality of the casualty, complete a field medical card with proper disposition.

REFERENCES: FM 8-10-6, FM 21-11

a. Disposition of Field Medical Cards.

(1) For casualties admitted and discharged and CRO cases. The original FMC of CRO case or of an admission with a disposition other than to a hospital will be sent to higher headquarters within the command for coding. After coding, the FMC will be disposed of in accordance with AR 25-400-2.

(2) For transfer casualties. When a casualty arrives at a hospital, his FMC will be used to prepare his ITR. This FMC will then become part of his ITR (AR 40-66, Chapter 10).

(3) For outpatients. The original of an FMC used to record outpatient treatment will be filed in the casualty's HREC (Health Record) or OTR (Outpatient Treatment Record).

(4) Carbon copies. All carbon copies of FMC will be destroyed locally after three months.

b. DA Form 4006.

DA Form 4006 (Field Medical Record Jacket) may be used as an envelope for the FMC. To keep the jacket from being opened while the casualty is in transit, pertinent personnel and medical data on the casualty may be recorded on the outside. The movement of the casualty may also be recorded. When the jacket has been so used, it must become a part of the ITR (Inpatient Treatment Record).

Instructions for filling out Field Medical Card
(DD Form 1380, Dec 91).

Block 1: Enter casualty's name, rank, and complete SSN. For foreign military personnel (including prisoners of war), enter military service number. Enter military occupational specialty or area of concentration for specialty code. Enter religion. Check appropriate box for sex.

Block 2: Enter casualty's unit of assignment and the country of whose armed forces the casualty is a member. Check armed service of the patient, that is, A/T = Army, AF/A = Air Force, N/M = Navy, and MC/M = Marine.

Block 3: Use figures to show location of injury or injuries. check appropriate box(es) to describe casualty injury or injuries.

Block 4: Check appropriate box.

Block 5: Write in the pulse rate and the time that the pulse was measured.

Block 6: Check yes or no box. Write in date and time that tourniquet was applied.

Block 7: Check yes or no box. Write in dose administered.
Write in date and time administered.

Block 8: Write in type of solution. Write in time and location given. If additional space is required, use Block 9.

Block 9: Write in information requested. If additional space is needed, use Block 14.

Block 10: Check appropriate box. Write in date and time of disposition.

Block 11: Write in signature and unit of medical officer completing form. Write in initials of combat medics initiating form on the right side of block.

Block 12: Write in date and time of arrival. Record blood pressure, pulse, and respirations in space provided.

Block 13: Document appropriate comments by date and time of observation.

Block 14: Document provider's orders by date and time. Record dose of tetanus administered and time administered. Record type and dose of antibiotic administered and time administered.

Block 15: Write in signature of provider or medical officer.

Block 16: Check appropriate box. Enter date and time.



Block 17: This block will be completed by the United Ministry Team. Check appropriate box of service provided. Write in signature of chaplain providing service.

The combat medic first attending battle casualties will initiate DD Form 1380 (Dec 91) by completing blocks 1, 3, 4, 7, 9, and 11 and by entering as much information in the remaining blocks as time permits. He or she will enter his or her initials in the far right side of the signature block (Block 11) (Figure 3-2).

Field Medical Card (FMC) DD Form 1380 (Dec 91) (Figure 3-1)

Reference FM 8-10-6

This DD Form 1380 (Dec 91) replaces previous editions of DD Form 1380 (Jun 62), which is obsolete.

1. LAST NAME, FIRST NAME/NOM ET PRÉNOM DOE, JOHN P				RANK/GRADE SGT		<input checked="" type="checkbox"/> MALE/HOMME <input type="checkbox"/> FEMALE/FEMME	
SSN/NUMÉRO MATRICULE 123-45-6789				SPECIALTY CODE/GPM 118		RELIGION/RELIGION CATHOLIC	
2. UNIT/UNITÉ							
FORCE/ÉLÉMENT				NATIONALITY/NATIONALITÉ USA			
A/T	AF/A	N/M	MC/M				
<input checked="" type="checkbox"/>							
<input checked="" type="checkbox"/> BC/BC		<input type="checkbox"/> NBI/BNC		DISEASE/MALADIE		PSYCH/PSYCH	
3. INJURY/BLESSURE <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> FRONT/DEVANT  </div> <div style="text-align: center;"> BACK/ARRIÈRE  </div> </div>				AIRWAY/TRACHÉE			
				HEAD/TÊTE			
				<input checked="" type="checkbox"/> WOUND/BLESSURE			
				NECK/BACK INJURY/ BLESSURE AU COU/AU DOS			
				BURN/BRÛLURE			
				AMPUTATION/AMPUTATION			
				STRESS/TENSION			
				OTHER (SPECIFY)/AUTRE (SPÉCIFIER)			
4. LEVEL OF CONSCIOUSNESS/NIVEAU DE CONSCIENCE							
<input type="checkbox"/> ALERT/ALERTE				<input type="checkbox"/> PAIN RESPONSE/RÉPONSE À LA DOULEUR			
<input checked="" type="checkbox"/> VERBAL RESPONSE/RÉPONSE VERBALE				<input type="checkbox"/> UNRESPONSIVE/SANS RÉPONSE			
5. PULSE/POULS		TIME/HEURE		6. TOURNIQUET/GARROT		TIME/HEURE	
				<input checked="" type="checkbox"/> NO/NON <input type="checkbox"/> YES/OUI			
7. MORPHINE/MORPHINE		DOSE/DOSE		TIME/HEURE		8. IV/IV	
<input checked="" type="checkbox"/> NO/NON <input type="checkbox"/> YES/OUI						RINGERS 1925	
9. TREATMENT/OBSERVATIONS/CURRENT MEDICATION/ALLERGIES/NSC (ANTIDOTE) TRAITEMENT/OBSERVATIONS/PRÉSENTE MÉDICAMENT/ALLERGIES/ANTIDOTES PRESSURE BANDAGE							
10. DISPOSITION/ DISPOSITION		RETURNED TO DUTY (RETOUR À L'UNITÉ)				TIME/HEURE	
<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/> EVACUATED/EVACUÉ				2030	
		<input type="checkbox"/> DECEASED/DÉCÉDÉ					
11. PROVIDER/UNIT/OFFICIER MÉDICALÉ/UNITÉ CPB						DATE/DATE (YYMMDD) 971212	

DD FORM 1380, DEC 91 This form replaces previous editions of DD Form 1380 and DD Form 1380 (TEST), which are obsolete.

U.S. FIELD MEDICAL CARD
FICHE MÉDICALE DE L'AVANT ÉTATS-UNIS

Figure 3-2 DD Form 1380 (DEC 91).

12. REASSESSMENT/RÉASSESSMENT				
GUNSHOT WOUND TO RIGHT THIGH				
DATE/DATE (YYMMDD) 971212			TIME OF ARRIVAL/HEURE D'ARRIVÉE 2100	
TIME/HEURE 2110				
BP/PS 140/85				
PULSE/POULS 95				
RESP/RESP 90				
DATE/TIME DATE/HEURE 971212 2115	13. CLINICAL COMMENTS/DIAGNOSIS INFORMATION MÉDICALE/DIAGNOSTIQUES FLESH WOUND NO BONE INVOLVEMENT SMALL ENTRY, ENLARGED EXIT WOUND			
	14. ORDERS/ANTIBIOTICS (Specify)/TETANUS/IV FLUIDS DIRECTIVES MÉDICALES/ANTIBIOTIQUES (Spécifier) TÉTANOS/IV FLUIDE CONTINUE RINGERS ADMINISTERED MORPHINE 5mg 2120 PRESSURE BANDAGE REPLACED			
15. PROVIDER/OFFICER MÉDICALE JAMES B. SMITH, CPT, SP			DATE/DATE (YYMMDD) 971212	
16. DISPOSITION/ DISPOSITION	<input type="checkbox"/>	RETURNED TO DUTY/RETOUR À L'UNITÉ		TIME/HEURE 2210
	<input checked="" type="checkbox"/>	EVACUATED/ÉVACUÉ		
	<input type="checkbox"/>	DECEASED/DÉCÉDÉ		
17. RELIGIOUS SERVICES SERVICES RELIGIEUX	<input type="checkbox"/>	BAPTISM/BAPTISÉ	<input type="checkbox"/>	PRAYER/PRIÈRE
	<input type="checkbox"/>	ANONING/ONCTION	<input type="checkbox"/>	COMMUNION/COMMUNION
	<input type="checkbox"/>	CONFESSION/CONFESSION	<input type="checkbox"/>	OTHER/AUTRE
CHAPLAIN/CHAPELAIN				

DD Form 1380, DEC 91 (Back)

Figure 3-2 DD Form 1380 (DEC 91) Continued.

3-7. **OBJECTIVE:** Given a list of signs and/or symptoms of bites or stings, identify and initiate treatment.

REFERENCES: FM 21-11

FIRST AID FOR BITES AND STINGS

INTRODUCTION

Snakebites, insect bites, or stings can cause intense pain and/or swelling. If not treated promptly and correctly, they can cause serious illness or death. The severity of a snakebite depends upon: whether the snake is poisonous or nonpoisonous, the type of snake, the location of the bite, and the amount of venom injected. Bites from humans and other animals, such as dogs, cats, bats, raccoons, and rats can cause severe bruises and infection, and tears or lacerations of tissue. Awareness of the potential sources of injuries can reduce or prevent them from occurring. Knowledge and prompt application of first aid measures can lessen the severity of injuries from bites and stings and keep the soldier from becoming a serious casualty.

a. Types of Snakes.

(1) Nonpoisonous Snakes. There are approximately 130 different varieties of nonpoisonous snakes in the United States. They have oval-shaped heads and round eyes. Unlike poisonous snakes, discussed below, nonpoisonous snakes do not have fangs with which to inject venom. See Figure 3-3 for characteristics of a nonpoisonous snake.

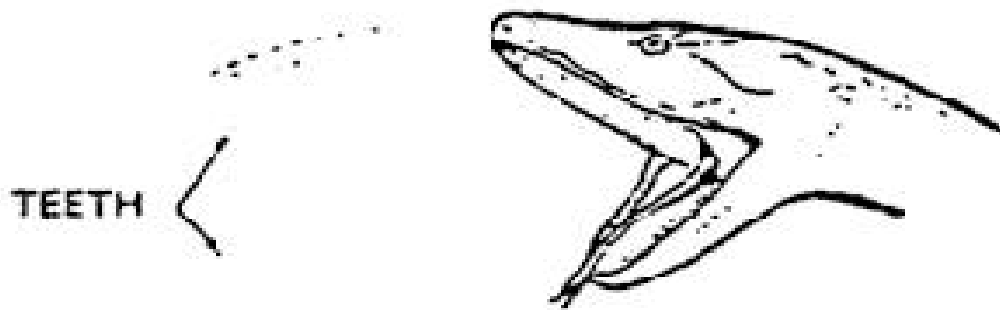


Figure 3-3. Non Poisonous snake.

(2) Poisonous Snakes. Poisonous snakes are found throughout the world, Primarily in tropical to moderate climates. Within the United States, there are four kinds: rattlesnakes, copperheads, water moccasins (cottonmouth), and coral snakes, the fer-de-lance, the bushmaster, and the tropical rattlesnake in tropical Central America; the Malayan pit viper in the tropical Far East; the cobra in Africa and Asia; the mamba (or black mamba) in Central and Southern Africa; and the krait in India and Southeast Asia. See Figure 3-4 for characteristics of a poisonous pit viper.

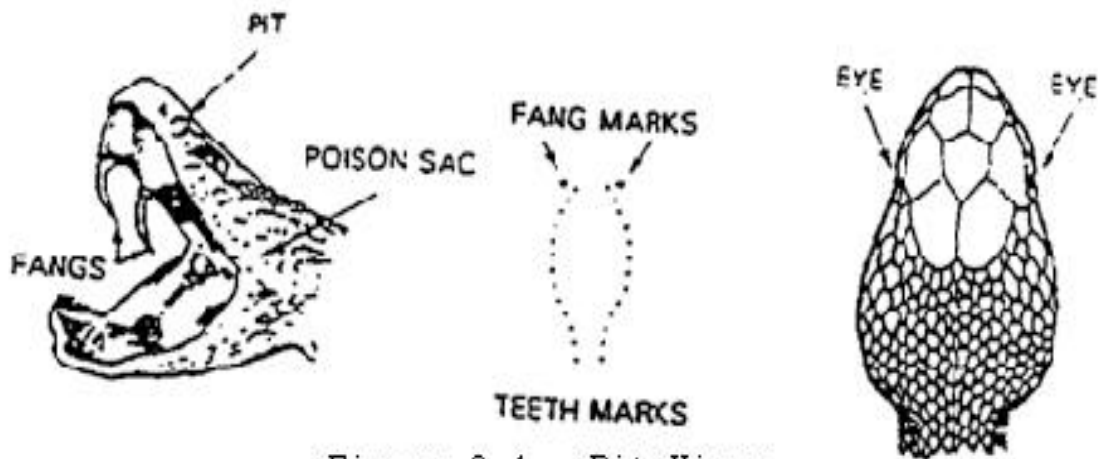
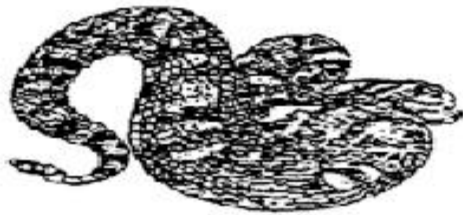


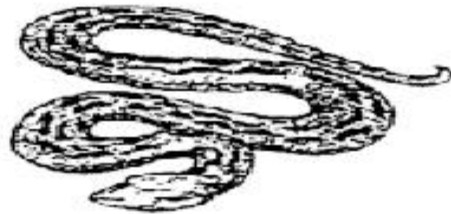
Figure 3-4. Pit Viper.

(3) Pit Vipers (Poisonous) See Figure 3-5 for illustrations.

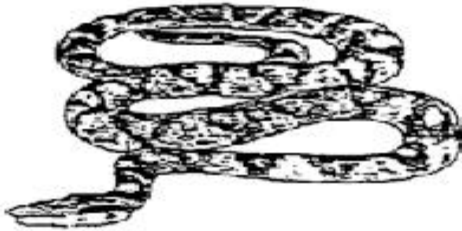
(a) Rattlesnakes, bushmasters, copperheads, fer-de-lance, Malayan pit vipers, and water moccasins (cottonmouth) are called pit vipers because of the small ' ' deep pits between the nostrils and eyes on each side of the head (Figure 3-5). In addition to their long, hollow fangs, these snakes have other identifying features; thick bodies, slit-like pupils of the eyes, and flat, almost triangular-shaped heads. Color markings and other identifying characteristics, such as rattles or a noticeable white interior of the mouth (cottonmouth), also help distinguish these poisonous snakes. Further identification is provided by examining the bite pattern of the wound for signs of fang entry. Occasionally there will be only one fang mark, as in the case of a bite on a finger or toe where there is no room for both fangs, or when the snake has broken off a fang.



Tropical Rattlesnake



Malayan Pit Viper



Bushmaster



Fer-de-Lance

(b) The casualty's condition provides the best information about the seriousness of the situation, or how much time has passed since the bite occurred. Pit viper bites are characterized by severe burning pain. Discoloration and swelling around the fang marks usually begins within five to ten minutes after the bite. If only minimal swelling occurs within thirty minutes, the bite will almost certainly have been from a nonpoisonous snake or possibly from a poisonous snake which did not inject venom. The venom destroys blood cells, causing a general discoloration of the skin. This reaction is followed by blisters and numbness in the affected area. other signs which can occur are weakness, rapid pulse, nausea, shortness of breath, vomiting, and shock.

(4) Corals, Cobras, Kraits, and Mambas. Corals, cobra, kraits, and mambas all belong to the same group even though they are found in different parts of the world. All four inject their venom through short, grooved fangs, leaving a characteristic bite pattern. See Figure 3-6 for illustration of a cobra snake.

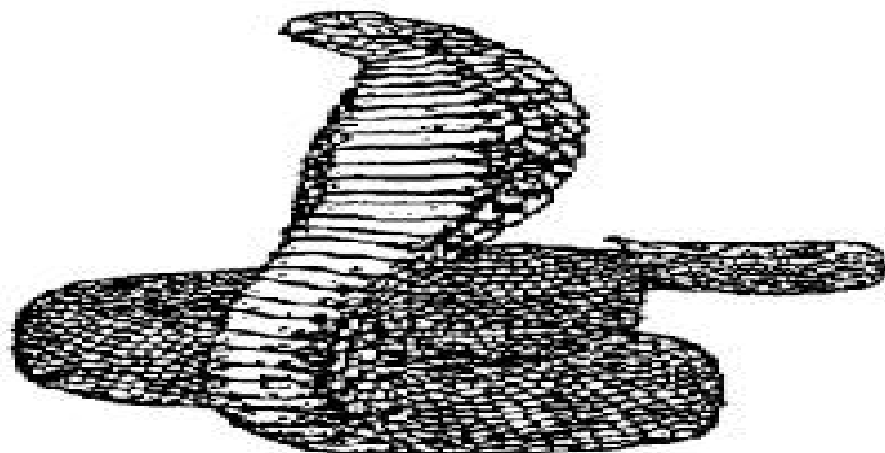


Figure 3-6. Cobra Snake

b. Snakebites.

If a soldier should accidentally step on or otherwise disturb a snake, it will attempt to strike. Chances of this happening while traveling along trails or waterways are remote if a soldier is alert and careful. Poisonous snakes **DO NOT** always inject venom when they bite or strike a person. However, all snakes may carry tetanus (lockjaw); anyone bitten by a snake, whether poisonous or nonpoisonous, should immediately seek medical attention. Poison is injected from the venom sacs through grooved or hollow fangs. Depending on the species, these fangs are either long or short. Pit vipers have long hollow fangs.

These fangs are folded against the roof of the mouth and extend when the snake strikes. This allows them to strike quickly and then withdraw. Cobras, coral snakes, kraits, mambas, sea snakes have short, grooved fangs. These snakes are less and effective in their attempts. to bite, since they must chew after striking to inject enough venom (poison) to be effective. See Figure 3-7 for characteristics of a poisonous snakebite. In the event you are bitten, attempt to identify and/or kill the snake. Take it to medical personnel for inspection/identification. This provides valuable information to medical personnel who deal with snakebites. **TREAT ALL SNAKEBITES AS POISONOUS.**

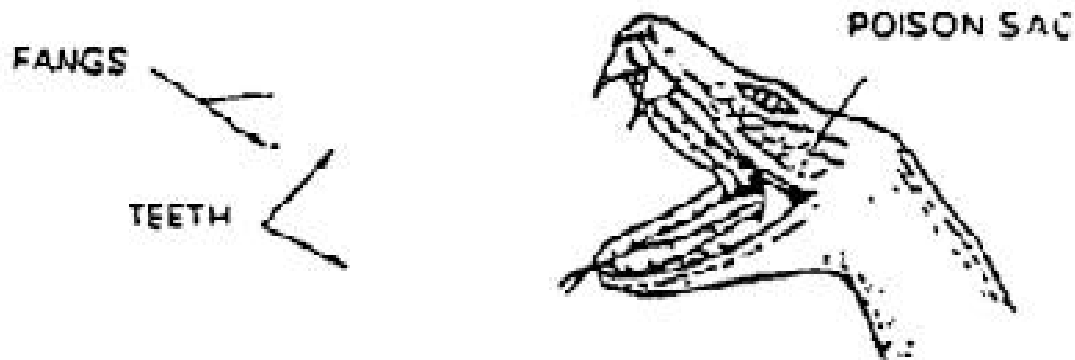


Figure 3-7. Poisonous Snake Bite.

(1) The small coral snake, found in the Southeastern United States, is brightly colored with bands of red, yellow (or almost white), and black completely encircling the body (Figure 3-8).

Other nonpoisonous snakes have the same coloring, but in the coral snake found in the United States, the red ring always touches the yellow ring. To know the difference between a harmless snake and the coral snake found in the United States, remember the following: "Red on yellow will kill a fellow; Red on black, venom will lack."



Figure 3-8. Coral Snake.

(2) The venom of corals, cobras, kraits, and mambas produces symptoms different from those of pit vipers. Because there is only minimal

pain and swelling, many people believe that the bite is not serious. Delayed reactions in the nervous system normally occur between one to seven hours after the bite. Symptoms include blurred vision, drooping eyelids, slurred speech, drowsiness, and increased salivation and sweating.

Nausea, vomiting, shock, respiratory difficulty, paralysis, convulsions, and coma will usually develop if the bite is not treated promptly.

(3) Sea Snakes. Sea snakes (Figure 3-9) are found in the warm water areas of the Pacific and Indian oceans, along the coasts, and at the mouths of some larger rivers. Their venom is **VERY** poisonous, but their fangs are only 1/4 inch long. The first aid outlined for land snakes also applies to sea snakes.

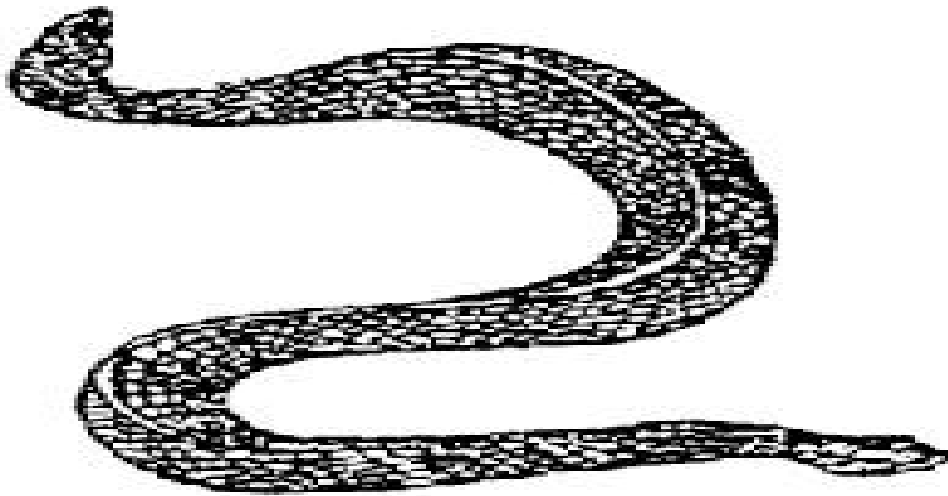


Figure 3-9. Sea Snake

(4) Venom. The venom of different snakes cause different effects. Pit viper venom (hemotoxins) destroy tissue and blood cells. Cobras, adders, and coral snakes inject powerful venom (neurotoxin) which affect the central nervous system, causing respiratory paralysis. Water moccasins and sea snakes have venom that is both hemotoxic and neurotoxic.

(5) Identification. The identification of poisonous snakes is very important since medical treatment will be different for each type of venom. Unless it can be positively identified, the snake should be killed and saved. When this is not possible or when doing so is a serious threat to others, identification may sometimes be difficult since many venomous snakes resemble harmless varieties. When dealing with snakebite problems in foreign countries, seek advice, professional or otherwise, which may help identify species in the particular area of operation.

(6) First Aid. Get the casualty to a medical treatment facility as soon as possible and with minimum movement. Until evacuation or treatment is possible, have the casualty lie quietly and not move any more than necessary. If the casualty has been bitten on an extremity, **DO NOT** elevate the limb; keep the extremity level with the body.

Keep the casualty comfortable and reassure him. If the casualty is alone when bitten, he should go to the medical facility himself rather than wait for someone to find him.

Unless the snake has been positively identified, attempt to kill it and send it with the casualty. Be sure that retrieving the snake does not endanger anyone or delay transporting the casualty.

(a) If the bite is on an arm or leg, place a constricting band (narrow cravat [swath], or narrow gauze bandage) one to two finger breadths above and below the bite (Figure 3-10). If the bite is on the hand or foot, place a single band above the wrist or ankle. The band should be tight enough to stop the flow of blood near the skin, but not tight enough to interfere with circulation. In other words, it should not have a tourniquet-like affect. If no swelling is seen, place the bands about one inch from either side of the bite. If swelling is present, put the bands on the part that is not swollen, at the edge of the swelling. If the swelling extends beyond the band, move the band to the new edge of the swelling. (If possible, leave the old band on, place a new one at the new edge of the swelling, and then remove and save the old one in case the process has to be repeated.) If possible, place an ice bag over the area of the bite. **DO NOT** wrap the limb in ice or put ice directly on the skin. Cool the bite area-do not freeze it. **DO NOT** stop to look for ice if it will delay evacuation and medical treatment.

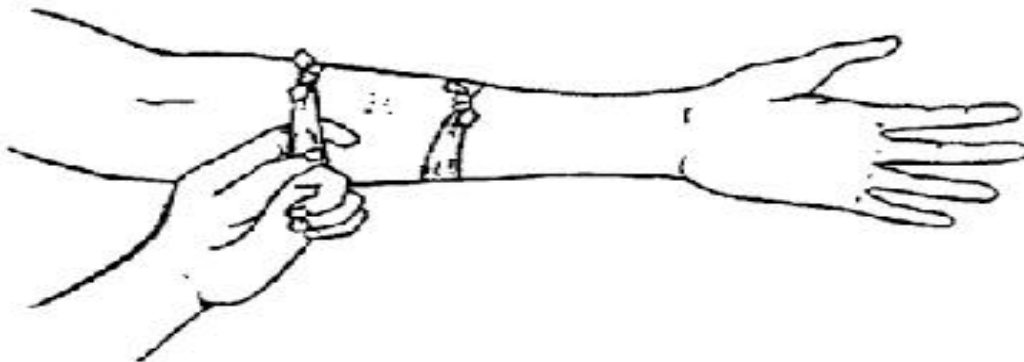


Figure 3-10. Constricting Band.

WARNING

DO NOT attempt to cut open the bite nor suck out the venom. If the venom should seep through any damaged or lacerated tissues in your mouth, you could immediately lose consciousness or even die.

(b) If the bite is located on an arm or leg, immobilize it at a level below the heart. **DO NOT** elevate an arm or leg even with or above the level of the heart.

WARNING

When a splint is used to immobilize the arm or leg, take extreme care to ensure the splinting is done properly and does not bind. Monitor it closely and adjust it if any changes in swelling occur.

(c) When possible, clean the area of the bite with soap and water. **DO NOT** use ointments of any kind.

(d) **NEVER** give the casualty food, alcohol, stimulants (coffee or tea), drugs, or tobacco.

(e) Remove rings, watches, or other jewelry from the affected limb.

(7) Prevention. Except for a few species, snakes tend to be shy or passive. Unless they are injured, trapped, or disturbed, snakes usually avoid contact with humans. The harmless species are often more prone to attack. All species of snakes are usually aggressive during their breeding season.

(a) Land snakes. Many snakes are active during the period from twilight to daylight. Avoid walking as much as possible during this time.

1 Keep your hands off rock ledges where snakes are likely to be sunning.

2 Look around carefully before sitting down, particularly if in deep grass among rocks.

3 Attempt to camp on clean, level ground. Avoid camping near piles of brush, rocks, or other debris.

4 Sleep on camping cots or anything that will keep you off the ground. Avoid sleeping on the ground if at all possible.

5 Check the other side of a large rock before stepping over it. When looking under any rock, pull it toward you as you turn it over so that it will shield you in case a snake is beneath it.

6 Try to walk only in open areas. Avoid walking close to rock walls or similar areas where snakes may be hiding.

7 Determine, when possible, what species of snakes are likely to be found in an area which you are about to enter.

8 Hike with another person. Avoid hiking alone in a snake infested area. If bitten, it is important to have at least one companion to perform lifesaving first aid measures and to kill the snake. Providing the snake to medical personnel will facilitate both identification and treatment.

9 Handle freshly killed venomous snakes only with a long tool or stick. Snakes can inflict fatal bites by reflex action even after death.

10 Wear heavy boots and clothing for some protection from snakebite. Keep this in mind when exposed to hazardous conditions.

11 Eliminate conditions under which snakes thrive: brush, piles of trash, rocks, or logs and dense undergrowth. Controlling their food (rodents, small animals) as much as possible is also good prevention.

(b) Sea Snakes. Sea snakes may be seen in large numbers but are not known to bite unless handled. Be aware of the areas where they are most likely to appear and be especially alert when swimming in these areas. Avoid swimming alone whenever possible.

WARNING

All species of snakes can swim. Many can remain under water for long periods. A bite sustained in water is just as dangerous as one on land.

c. Human and other Animal Bites. Human or other land animal bites may cause laceration or bruises.

In addition to damaging tissue, human or bites from animals such as dogs, cats, bats, raccoons, or rats always present the possibility of infection.

(1) Human Bites. Human bites that break the skin may become seriously infected since the mouth is heavily contaminated with bacteria. All human bites **MUST** be treated by medical personnel.

(2) Animal Bites. Land animal bites can result in both infection and disease. Tetanus, rabies, and various types of fevers can follow an untreated animal bite. Because of these possible complications, the animal causing the bite should, if possible, be captured or killed (without damaging its head) so that competent authorities can identify and test the animal to determine if it is carrying diseases.

(3) First Aid.

(a) Cleanse the wound thoroughly with soap or detergent solution.

(b) Flush it well with water.

(c) Cover it with a sterile dressing.

(d) Immobilize an injured arm or leg.

(e) Transport the casualty immediately to a medical treatment facility.

NOTE

If unable to capture or kill the animal, provide medical personnel with any information possible that will help identify it. Information of this type will aid in appropriate treatment.

d. Marine (Sea) Animals. With the exception of sharks and barracuda, most marine animals will not deliberately attack. The most frequent injuries from marine animals are wounds by biting, stinging, or puncturing. Wounds inflicted by marine animals can be very painful, but are rarely fatal.

(1) Sharks, Barracuda, and Alligators. Wounds from these marine animals can involve major trauma as a result of bites and lacerations. Bites from large marine animals are potentially the most life threatening of all injuries from marine animals.

Major wounds from these animals can be treated by controlling the bleeding, preventing shock, giving basic life support, splinting the injury, and by securing prompt medical aid.

(2) Turtles, Moray Eels, and Corals. These animals normally inflict minor wounds. Treat by cleansing the wound(s) thoroughly and by splinting if necessary.

(3) Jellyfish, Portuguese Man-O-War, Anemones, and others. This group of marine animals inflict injury by means of

stinging cells in their tentacles. Contact with the tentacles produces burning pain with a rash and small hemorrhages on the skin. Shock, muscular cramping, nausea, vomiting, and respiratory distress may also occur. Gently remove the clinging tentacles with a towel and wash or treat the area. Use diluted ammonia or alcohol, meat tenderizer, and talcum powder. If symptoms become severe or persist, seek medical aid.

(4) Spiny Fish, Urchins, Stingrays, and Cone Shells. These animals inject their venom by puncturing with their spines. General signs and symptoms include swelling, nausea, vomiting, generalized cramps, diarrhea, muscular paralysis, and shock. Deaths are rare. Treatment consists of soaking the wounds in hot water (when available) for 30 to 60 minutes. This inactivates the heat sensitive toxin. In addition, further first aid measures (controlling bleeding, applying a dressing, and so forth) should be carried out as necessary.

e. Insect Bites/Stings. An insect bite or sting can cause great pain, allergic reaction, inflammation, and infection. If not treated correctly, some bites/ stings may cause serious illness or even death. When an allergic reaction is not involved, first aid is a simple process. In any case, medical personnel should examine the casualty at the earliest possible time. It is important to properly identify the spider, bee, or creature that caused the bite/sting, especially in cases of allergic reaction when death is a possibility.

(1) Types of Insects. The insects found throughout the world that can produce a bite or sting are too numerous to mention in detail. Commonly encountered stinging or biting insects include brown recluse spiders (Figure 3-11), black widow spiders (Figure 3-12), tarantulas (Figure 3-13), scorpions (Figure 3-14), urticating caterpillars, bees, wasps, centipedes, cone-nosed beetles (kissing bugs), ants, and wheel bugs. Upon being reassigned, especially to overseas areas, take the time to become acquainted with the types of insects to avoid.

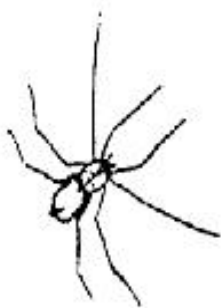


Figure 3-11. Brown Recluse



Figure 3-12. Black Widow.



Figure 3-13. Tarantula

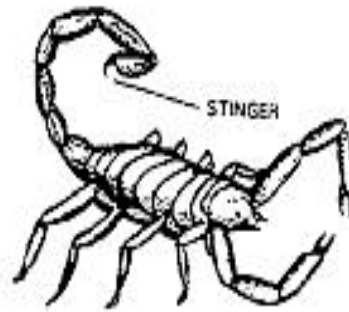


Figure 3-14. Scorpion

(2) Signs/Symptoms. Discussed in paragraphs (1) and (2) below are the most common effects of insect bites/stings. They can occur alone or in combination with the others.

(a) Less Serious. Commonly seen signs/symptoms are pain, irritation, swelling, heat, redness, and itching. Hives or wheals (raised areas of the skin that itch) may occur. These are the least severe of the allergic reactions that commonly occur from insect bites/stings. They are usually dangerous only if they affect the air passages (mouth, throat, nose, and so forth), which could interfere with breathing. The bites/stings of bees, wasps, ants, mosquitoes, fleas, and ticks are usually not serious and normally produce mild and localized symptoms. A tarantula's bite is usually no worse than that of a bee sting. Scorpions are rare and their stings (except for a specific species found only in the Southwest desert) are painful but usually not dangerous.

(b) Serious. Emergency allergic or hypersensitive reactions sometimes result from the stings of bees, wasps, and ants. Many people are allergic to the venom of these particular insects. Bites or stings from these insects may produce more serious reactions, to include generalized itching and hives, weakness, anxiety, headache, breathing difficulties, nausea, vomiting, and diarrhea. Very serious allergic reactions (called anaphylactic shock) can lead to complete collapse, shock, and even death. Spider bites (particularly from the black widow spider) affect the nervous system. This venom can cause muscle cramps, a rigid, nontender abdomen, breathing difficulties, sweating, nausea and vomiting. The brown recluse spider generally produces local rather than system-wide problems; however, local tissue damage around the bite can be severe and can lead to an ulcer and even gangrene.

(3) First Aid. There are certain principles that apply regardless of what caused the bite/sting. Some of these are:

(a) If there is a stinger present, for example from a bee, remove the stinger by scraping the skin's surface

with a fingernail or knife. **DO NOT** squeeze the sac attached to the stinger because it may inject more venom.

(b) Wash the area of the bite/sting with soap and water (alcohol or an antiseptic may also be used) to help reduce the chances of an infection and remove traces of venom.

(c) Remove jewelry from bitten extremities because swelling is common and may occur.

(d) In most cases of insect bites the reaction will be mild and localized; use ice or cold compresses (if available) on the site of the bite/sting. This will help reduce swelling, ease the pain, and slow the absorption of venom. Meat tenderizer (to neutralize the venom) or calamine lotion (to reduce itching) may be applied locally. If necessary, seek medical aid.

(e) In more serious reactions (severe and rapid swelling, allergic symptoms, and so forth) treat the bite/sting like you would treat a snakebite; that is, apply constricting bands above and below the site. See paragraph 2d(1) above for details and illustration (Figure 3-10) of a constricting band.

(f) Be prepared to perform basic life supporting measures, such as rescue breathing and CPR.

(g) Reassure the casualty and keep him calm.

(h) In serious reactions, attempt to capture the insect for positive identification; however, be careful not to become a casualty yourself.

(i) If the reaction of symptoms appear serious, seek medical aid immediately.

NOTE

Be aware that some allergic or hypersensitive individuals may carry identification (such as a MEDIC ALERT tag) or emergency insect bite treatment kits. If the casualty is having an allergic reaction and has such kit, administer the medication in the kit according to the instructions which accompany the kit.

(4) Prevention. Some prevention principles are:

(a) Apply insect repellent to all exposed skin, such as the ankles to prevent insects from creeping between uniform and boots. Also, apply the insect repellent to the shoulder blades where the shirt fits tight enough that mosquitoes bite through. **DO NOT** apply insect repellent to the eyes.

(b) Reapply repellent every two hours during strenuous activity and soon after stream crossings.

(c) Blouse the uniform inside the boots to further reduce risk.

1 Wash yourself daily if the tactical situation permits. Pay particular attention to the groin and armpits.

2 Use the buddy system. Check each other for insect bites. Wash your uniform at least weekly.

(5) Supplemental Information. For additional information concerning biting insects, see FM 21-10.

f. See Table 3-4 for information on bites and stings.

Table 3-4. Bites and Stings	
Types	First Aid
Snakebite	<ol style="list-style-type: none"> 1. Move the casualty away from the snake. 2. Remove all rings and bracelets from the affected extremity. 3. Reassure the casualty and keep him quiet. 4. Place ice or freeze pack, if available, over the area of the bite. 5. Apply constricting band(s) 1-2 finger breadths proximal to the bite. One should be able to insert a finger between the band and the skin. <ul style="list-style-type: none"> - Arm or leg bite, place one band above and one band below the bite site. - Hand or foot bite, place one band above the wrist or ankle. 6. Immobilize the affected part in a position below the level of the heart. 7. Kill the snake (if possible, without damaging its head or endangering yourself) and send it with the casualty. 8. Seek medical aid immediately.
Brown Recluse Spider or Black Widow Spider Bite	<ol style="list-style-type: none"> 1. Keep the casualty quiet. 2. Wash the area. 3. Apply ice or freeze pack, if available. 4. Seek medical aid.
Tarantula Bite Scorpion Sting Ant Bites	<ol style="list-style-type: none"> 1. Wash the area. 2. Apply ice or freeze pack, if available. 3. Apply baking soda, calamine lotion, or meat tenderizer to bite site to relieve pain and itching. 4. If site of bite(s) or sting(s) is on the face, neck (possible airway problems), or genital area, or if local reaction seems severe, or if the sting is by the dangerous type of scorpion found in the Southwest keep the casualty quiet as possible and seek immediate medical aid.
Bee Stings	<ol style="list-style-type: none"> 1. If the stinger is present, remove by scraping with a knife or fingernail. DO NOT squeeze venom sac on stinger; more venom may be injected. 2. Wash the area. 3. Apply ice or freeze pack, if available.

4. If allergic signs/symptoms appear, be prepared to perform basic life support measures and seek immediate medical aid.

3-8. **OBJECTIVE:** Given a list of signs and/or symptoms caused by contact with poisonous plants, select the proper medical treatment.

REFERENCES: FM 21-11

TEXT: a. General.

(1) Contact poisoning is a skin eruption which is caused by direct or indirect contact with the sap (or juice) of poisonous plants. In the United States alone, several thousand cases of contact poisoning occur each year. The most common plants which cause these skin eruptions are Poison Ivy, Poison Oak, and Poison sumac.

(2) These skin eruptions can be prevented by learning how to identify poisonous plants and by taking the proper control measures.

(a) The skin eruptions first appear as redness and swelling accompanied by severe burning and itching.

(b) Blisters appear later.

(3) Poisonous plants are most likely to exist in areas of dense vegetation. Poison Ivy, Poison Oak, and Poison Sumac contain a sticky sap which has a toxic ingredient known as Urushiol.

(a) Urushiol is contained in all parts of these plants and is even present in their stems and roots.

(b) Urushiol is the agent that causes the skin irritation. Contact with Urushiol may also be made indirectly by touching Urushiol-contaminated tools, weapons, clothing, and pets, and from another person having Urushiol on the skin or clothing. Even smoke from plants that are burning contain droplets of Urushiol which can get on the skin or enter the nose, throat, and lungs.

b. Preventive Measures for Poisonous Plant Injuries.

(1) Be able to identify the plants which cause contact poisoning.

(2) Avoid selecting bivouac areas which are infected with poisonous plants.

(3) Wear gloves and be fully clothed (with sleeves unrolled and buttoned and collar buttoned) when working in an area likely to have poisonous plants.

(4) Wash all exposed skin areas with a strong soap solution or with alcohol if exposure to poisonous plants is known or suspected.

(5) Use hot water and soap to wash all clothing and equipment known or suspected to be contaminated.

(6) Burn poisonous plants on the **DOWNWIND** side of the bivouac or troop area to avoid contamination with the smoke which contains Urushiol droplets.

CAUTION

Urushiol droplets contained in the smoke will cause internal swelling which could result in extreme breathing difficulty

c. Treat Poisonous Plant Injuries.

(1) Recognize the Poison Ivy (*Rhus Radicans*) plant (Figure 3-25).

(a) Poison Ivy grows as a small plant, either vine or shrub.

(b) It grows everywhere in the United States except California and parts of the adjacent states. Eastern Oak Leaf Ivy is one of its varieties.

(c) The leaves of this plant always consist of three glossy leaflets.

(d) The plant may also be known as Three-Leaf Ivy, Poison Creeper, Climbing Sumac, Poison Oak, and Mercury.



Figure 3-15. Poison Ivy

(2) Recognize the Poison Oak (*Rhus Diversiloba*) plant (Figure 3-16).

(a) Poison Oak grows as a shrub and sometimes as

(b) It grows throughout the United States.

(c) It is sometimes called Poison Ivy.

(d) Its leaves always consist of three smaller leaflets.

(3) Recognize the Poison Sumac (Rhus, Vernix) plant

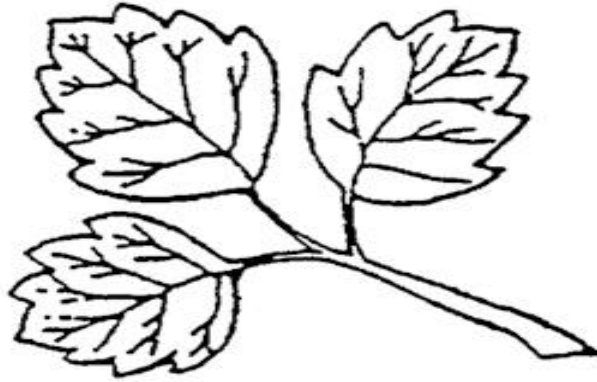


Figure 3-16. Poison Oak

(Figure 3-17).

(a) Poison Sumac grows as woody shrubs or small trees having compound leaves and flowers, succeeded by red, hairy fruits.

(b) It grows in most of the eastern third of the United States.

(c) This plant may also be known as Swamp Sumac, Poison Dogwood, and Thunderwood.



Figure 3-17. Poison Sumac

(4) Signs and symptoms of contact poisoning.

(a) Redness and swelling of involved skin.

(b) Headache.

(c) Burning sensation on involved parts of the body.

(d) Skin eruptions (rash).

(e) Skin itching.

NOTE

The rash may appear from within a few hours to as many as 48 hours after exposure

(f) Blisters on the involved skin. The blisters break after two to four days and leave a raw surface which becomes encrusted. They will usually heal within two weeks.

NOTE

The redness and swelling generally appear first, followed by the blisters.

(5) Treatment for contact poisoning.

(a) Thoroughly wash the exposed area(s) of the casualty's skin with soap and water or with alcohol to remove or reduce the amount of Urushiol on the skin.

(b) Confine the washing to the affected area to avoid spreading the poison to other parts of the body.

(c) Wash the area several times in succession. Use a fresh solution for each wash.

(d) Apply alcohol to the affected area to further cleanse it and to help prevent secondary infections.

(e) Apply Calamine lotion to soothe the contaminated area and help in healing. **DO NOT** apply Calamine lotion to raw areas as they may cause infection.

(f) Administer Benadryl to decrease the allergic reaction.

(g) Do not dress the affected area as this will cause retention of moisture and will not allow the contaminated area to dry.

(h) Avoid contact with the contaminated water in the event you are allergic to the source.

(i) Thoroughly wash your hands and any part of your body which may have come in contact with the Urushiol; also, remove all of your clothing exposed to Urushiol. This will help in preventing your contracting the poison following the administration of treatment to the casualty.

(6) Record the treatment given.

(7) Evacuate the casualty, if necessary. Depending on the severity of the contamination, limited duty or evacuation to an MTF may be necessary.

3-9. **OBJECTIVE:** Given a list of steps to be performed, select the proper sequence for one and two man CPR.

REFERENCES: American Heart Association, Basic Life Support
For Health Care Providers

a. Perform one-Rescuer Cardiopulmonary Resuscitation (see Figure 3-18).

(1) Perform fifteen compressions at the rate of 100 compressions per minute. Count one and two and three-to fifteen.

(2) After administering fifteen compressions, quickly move to the casualty's head, open the airway, and deliver two full breaths.

(3) Move back to the chest, relocate the hand position, and administer fifteen compressions.

(4) Repeat this procedure for four cycles.

(5) After administering four cycles of fifteen compressions and two ventilations, move to the casualty's head, locate the carotid artery, and check for a pulse. If no pulse is felt, open the airway, administer two full breaths, and resume CPR.

(6) Check the pulse every few minutes. If a pulse is present, continue rescue breathing only.

NOTE

Sometimes when performing one-rescuer CPR, you may be approached by another individual who can assist you. You should begin two-rescuer CPR immediately. It is more advantageous to administer two-rescuer CPR rather than one because the casualty receives more oxygen, the chest compressions are not interrupted, and the problem with rescuer fatigue is lessened. Two-rescuer CPR should be performed with one rescuer each side of the casualty.

b. Perform Two-Rescuer Cardiopulmonary Resuscitation (see Figure 3-18).

(1) When there are two rescuers, one performing rescue breathing and the other administering external chest compression, the person administering external chest compression should compress the heart at 100 compressions per minute. The compressions must be uninterrupted, regular, and smooth. Relaxation must immediately follow compression and should be of equal duration. Proper timing for 100 compressions per minute with a natural rhythm is achieved by counting aloud as follows: "one and two and three and four and five." There should be no pause or hesitation following the fifth compression prior to the first compression of the next cycle of five. Each time the rescuer says the counting number, he compresses the heart; and as he says, "and" he releases the pressure.

NOTE

CPR should be performed only by qualified personnel.

(2) The member of the rescue team who is performing rescue breathing (the ventilator) quickly blows into the casualty's lungs after each five compressions (5:1 ratio). In other words, when the other rescuer (the chest compressor) says, "five, one-thousand," this is the signal for the ventilator to blow a deep breath into the casualty's airway. The breaths are given without any pauses in compression.

This is **IMPORTANT**, because any interruption in heart compression results in a drop in blood flow and blood pressure can fall to zero. Additionally, the ventilator should feel for the carotid pulse frequently. Once a pulse is detected, he stops CPR and monitors the casualty. Rescue breathing may still have to be performed.

NOTE

Ventilation and compression should be interrupted every few minutes to check for return of breathing and to check for pulse. A logical time to do this would be at the time of the switch in position of the rescuers.

(3) Two rescuers can perform CPR best when they are on opposite sides of the casualty. They can then switch positions without any significant interruption in the five to one rhythm. This can be smoothly accomplished when the chest compressor says, "change, one and two and three and four and five." The ventilator after giving a breath, moves into position to give compressions. The chest compressor, after giving the fifth compression, moves to the casualty's head and checks the carotid pulse for five seconds but no longer. If a pulse is detected, he stops CPR and monitors the casualty. Rescue breathing may still be needed. If no pulse is felt, the rescuer at the head gives a breath and says, "No Pulse." The new chest compressor then restarts compressions.

c. Cessation of Resuscitative Measures. **DO NOT** stop . resuscitative measures if you start to feel discomfort. You may have to perform these lifesaving measures for a long time after feeling the heavy effects of body discomfort and fatigue. Continue them until the casualty starts to breathe on his own or until you are relieved by another individual or until you cannot continue.

(4) See Appendix I (page I-21/22) for the two rescuer CPR decision tree.

3-10. **OBJECTIVE:** Given a list of stated conditions, select the proper treatment for a casualty in a nuclear, chemical, or biological environment.

REFERENCES: FM 21-11

Section I

INTRODUCTION

a. General.

The introduction of nuclear, biological, or chemical (NBC) warfare on the battlefield will greatly strain the capabilities of the medical specialist in his role as the first level of medical care to combat forces.

b. Employment of NBC Weapons.

The enemy may use one or more types of warfare agents in the same area of operations. You may encounter casualties suffering from the effects of radiation and chemical agents at the same time. Section II through IV discuss the types of injuries you will see and will need to provide care for. You will continue to see injuries and illnesses caused by other sources in addition to those caused by NBC warfare.

Section II

NUCLEAR CASUALTIES

c. General.

Nuclear injuries can be divided into three types: blast, thermal, and radiation sickness. Each type of injury can occur without the others, all three can occur at the same time, or in a combination of any two.

d. Blast Injuries.

(1) The types of blast injuries caused by nuclear weapons are more varied than those caused by conventional weapons. Blast injuries are the result of the direct action of the blast wave over pressure, the indirect action of flying debris, or the violent slamming of individuals against other objects. Blast injuries may be complicated by thermal and/or radiation injuries.

(2) Signs and symptoms of blast injuries are:

(a) Wounds.

(b) Cuts.

(c) Abrasions.

(d) Impalements.

(e) Soft tissue cavitation (with or without perforating wounds of the chest or the abdomen).

(3) The treatment for nuclear blast injuries is the same as for any other type of blast injury caused by day to day accidents or conventional weapons.

e. Thermal Injuries.

(1) Large numbers of burn casualties from most conventional weapons are uncommon. However, in nuclear warfare, burns are frequently seen injuries. This creates a very serious problem for health service support personnel.

(2) The signs and symptoms of thermal injuries are the same as for burns from any other heat source and include discoloration, blisters, charred skin and tissue, and severe edema in all burn areas. Clothing may be stuck to the skin over large areas of the body. The respiratory track may be involved due to inhalation of heat with burns extending deep into the alveoli.

(3) The treatment for thermal injuries is the same as for non-nuclear burns. See Chapter 13 for treatment procedures.

f. Radiation Injuries.

(1) Radiation injury (sickness) can result from:

(a) A single exposure to radiation at the time of detonation of a nuclear weapon, or

(b) An exposure to high levels of fallout radiation, or

(c) Exposure to induced radiation, or

(d) A repeated exposure to any of these sources.

(2) The sickness pattern is manifested in three syndromes. These are the hematopoietic, gastrointestinal, and central nervous system syndromes. The hematopoietic (bone-marrow depression) syndrome occurs at lower doses than the others and is the most common form of radiation sickness seen in nuclear combat. As the lethality probability nears 100 percent with higher doses, the gastrointestinal syndrome will dominate. This syndrome develops from a combination of bone-marrow depression and gastrointestinal tract damage. The central nervous system syndrome appears when supralethal doses are absorbed. Aircrews exposed to prompt nuclear radiation from high level detonation and personnel protected from blast and thermal effects by below surface sites are more susceptible to this syndrome.

(3) The signs and symptoms of radiation sickness follow similar patterns as the syndromes. They can be divided into three phases:

(a) Acute Incapacitation. The initial phase of transient acute incapacitation is during the first few hours of exposure and is characterized by the rapid onset of nausea, vomiting, and malaise. This phase only lasts for a few hours and should not be severe enough to require evacuation if exposure is to low doses of radiation.

(b) Latent Period. Following recovery from the initial phase there will be a period during which the exposed individual will be symptom-free. The length of this period varies with the dose and nature of the initial phase. The longest period is two to six weeks preceding bone-marrow

depression. Prior to the gastrointestinal syndrome, it lasts from a few days to a week. It is shortest preceding the nervous system syndrome, lasting from a few hours to three days.

(c) Clinical Period. During the gastrointestinal syndrome there will be a severe fluid loss and bloody diarrhea; the bone-marrow depression syndrome will follow. The bone-marrow depression will be manifested by problems of bleeding, anemia, and decreased resistance to infection.

(4) The central nervous system syndrome is associated with higher acute doses of radiation. The clinical picture for this syndrome is a steadily deteriorating state of consciousness with eventual coma and death.

(5) Treatment for radiation sickness by the medical specialist consists of fluid replacement when fluid loss is significant and symptomatic care until the casualty is evacuated to an MTF for definitive care/treatment.

Section III

BIOLOGICAL AGENT CASUALTIES

g. General.

The microorganisms used for the production of biological agents are disease-producing organisms which may have been altered or may actually be the disease organism as found in every day life. Other biological agents, such as yellow rain, are laboratory made. The synthesized agents are known as micro-toxins (toxins). The biological agents may be delivered to the battlefield by the use of modern weapons, as well as through contaminated food products, water, and insect vectors.

h. Signs and Symptoms of Biological Agent Casualties.

The signs and symptoms of biological agents are as unlimited as the sources of infective disease organisms. The signs and symptoms are the same as for non-warfare agent infections and diseases. (Field Manual 8-33 provides the signs and symptoms for most disease-producing organisms.) The signs and symptoms for some toxins are massive mucous membrane tissue hemorrhage and severe skin rashes.

i. Treatment for Biological Agent Casualties.

Treatment for biological agent casualties may be the same as for non-warfare agent casualties with the same type of illness. Example: biological agent-induced typhoid fever would be treated the same as for non-warfare agent-induced typhoid. (See FM 8-33 for specific treatment.) The treatment for toxins is symptomatic.

Section IV

CHEMICAL AGENT INJURIES

j. General.

Chemical warfare agents affect specific body functions and systems. The agents are classified by their physiological action and military use.

(1) Physiological action.

(a) Nerve agents such as Soman (GD), Tabun (GA), Sarin (GB), and VX inhibit cholinesterase enzymes throughout the body. Since the normal function of these enzymes is to hydrolyze acetylcholine wherever this compound is liberated, such inhibition results in the accumulation of excessive concentrations of acetylcholine at its various sites of action. These include:

1 The endings of the parasympathetic nerves to the smooth muscle of the iris, ciliary body, bronchial tree, gastrointestinal tract, bladder, and blood vessels; to the secretory glands of the respiratory tract; to the cardiac muscle; and to the endings of the sympathetic nerves to the sweat glands.

2 The endings of motor nerves to voluntary muscles and or nerves to autonomic ganglia.

3 The central nervous system.

4 Blister agents (vesicants, which include the mustards, arsenicals [Lewisite], and phosgene oxime) produce the following:

a Local irritation and damage to the skin and mucous membranes.

b Pain and injury of the eyes.

c Reddening and blistering of the skin. Also, when inhaled, blister agents damage the respiratory tract, with resultant development of bronchopneumonia. If tissue damage is severe, shock may occur. Systemic absorption of the vesicant may also be followed by bone-marrow depression.

d Choking agents, such as phosgene, irritate and damage the lower respiratory tract, resulting in pulmonary edema and possibly secondary pneumonia.

e Blood agents (cyanides) stop essential physiological processes. Blood agents such as hydrocyanic acid (AC) and cyanogen chloride (CK) are absorbed into the blood and are carried to all body tissues where the action is a local one inhibiting oxidative processes so that oxygen cannot be transferred from red blood cells to tissue cells. With hydrogen cyanide, respiration is first stimulated and then depressed;

convulsions may occur. Cyanogen chloride rapidly causes dyspnea (labored breathing) and has an additional local irritant action on the nose, throat, eyes, and respiratory tract.

(2) Military Use.

(a) Toxic chemical agents are used to produce serious injury or death. They include nerve agents, blister agents, and blood agents.

(b) Incapacitating agents are used to produce temporary physical or mental effects, or both.